

REMARKS

Claims 1 through 11 are pending in this application. Claims 1, 2 and 8 through 11 have been amended. Care has been exercised to avoid the introduction of new matter. Indeed, adequate descriptive support for the present Amendment should be apparent throughout the originally filed disclosure as, for example, Fig. 1 and the related disclosure thereof in the written description of the specification as to the amendment to claim 1, page 13 of the written description, lines 15 through 20 with respect to the amendment to claim 2, noting that the amendment to claims 8 through 11 address formalistic issues. Applicants submit that the present Amendment does not generate any new matter issue.

Claim Objection

The Examiner objected to claims 8 through 11, identifying perceived antecedent basis issues. This objection is traversed.

Initially, the mere identification of a perceived literal antecedent basis issue is not automatically objectionable. *Bose Corporation v. JBL, Inc.* 274 F.3d 1354, 61 USPQ2d 1216 (Fed. Cir. 2001) (*Antecedent basis*). At any rate, in order to expedite prosecution, claims 8 through 11 have been amended to address the antecedent basis issues raised by the Examiner. Accordingly, withdrawal of the objection to claims 8 through 11 is solicited.

Claim 1 was rejected under 35 U.S.C. §102 for lack of novelty as evidenced by Li et al.

In the statement of the rejection, the Examiner referred to Fig. 10 (cover Fig.) of Li et al., asserting the disclosure of an interconnection structure corresponding to that claimed including first conductive layer 68, insulating layer 76, second conductive layer 100 and barrier metal layer 92. This rejection is traversed.

The factual determination of lack of novelty under 35 U.S.C. §102 requires the identical disclosure in a single reference of each element of a claimed invention, such that the identically claimed invention is placed into the recognized possession of one having ordinary skill in the art. *Dayco Prods., Inc. v. Total Containment, Inc.* 329 F.3d 1358 (Fed. Cir. 2003); *Crown Operations International Ltd. v. Solutia Inc.*, 289 F.3d 1367, 62 USPQ2d 1917 (Fed. Cir. 2002). There is a significant difference between the invention defined in claim 1 and the interconnection structure disclosed by Li et al. that scotches the factual determination that Li et al. disclose an interconnection structure identically corresponding to that claimed.

Specifically, in accordance with independent claim 1, a single barrier metal layer is formed on the entire surface defining the hole and the groove in the insulating layer. No such structure is disclosed or suggested by Li et al. Indeed, adverting to Fig. 10 of Li et al., the Figure relied upon by the Examiner, it should be apparent that barrier metal layer 92 is separated into a plurality of layers in the hole portion of the first dielectric layer 76 and a groove portion of the second dielectric layer 84. However, **no** portion of barrier layer 92 is formed on the **bottom surface of the groove** in the second dielectric layer 84.

The above argued structural difference between the claimed interconnection structure and the interconnection structure disclosed by Li et al. undermines the factual determination that Li et al. disclose an interconnection structure identically corresponding to that claimed. *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); *Kloster Speedsteel AB v. Crucible Inc.*, 793 F.2d 1565, 230 USPQ 81 (Fed. Cir. 1986). Applicants, therefore, submit that the imposed rejection of claim 1 under 35 U.S.C. §102 for lack of novelty as evidenced by Li et al. is not factually viable and, hence, solicit withdrawal thereof.

Claims 5 through 9 were rejected under 35 U.S.C. §102 for lack of novelty as evidenced by Moslehi.

In the statement of the rejection, the Examiner referred to Fig. 3 of Moslehi, asserting the illustration of first and second holes reaching a first conductive layer N-1. The Examiner then referred to column 14, lines 8 through 11, asserting the disclosed use of stacked dummy contact and via plugs. This rejection is traversed as factually erroneous.

As previously argued, the factual determination of lack of novelty under 35 U.S.C. §102 requires the identical disclosure in a single reference of each element of a claimed invention, such that the identically claimed invention is placed into the recognized possession of one having ordinary skill in the art. *Dayco Prods., Inc. v. Total Containment, Inc.*, *supra*; *Crown Operations International Ltd. v. Solutia Inc.*, *supra*. Moreover, in imposing the rejection under 35 U.S.C. §102 for lack of novelty, the

Examiner is required to specifically identify wherein an applied reference is perceived to identically disclose each feature of a claimed invention. *In re Rijckaert*, 9 F.3d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993); *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481 (Fed. Cir. 1984). That burden has not been discharged. Indeed, there are significant differences between the claimed interconnection structure and Moslehi's interconnection structure that scotch the factual determination that Moslehi discloses an interconnection structure identically corresponding to that claimed.

Specifically, in the interconnection structure defined in independent claim 5 the second hole is used as a dummy hole which does not electrically connect the first conductive layer to another element. **No** such structure is disclosed or suggested by Moslehi. In this respect, Applicants would point out that the excerpt relied upon by the Examiner in column 14 refers to Fig. 13, not Fig. 3 relied upon by the Examiner. Moreover, the excerpt in column 4 referring to Fig. 13 merely states that dummy contact and via plugs may be provided for additional support between the **top and bottom etch-resistant layers**. That is a far cry from the second hole employed in the claimed interconnection structure which reaches the first conductive layer and is employed as a dummy hole which does not connect the first conductive layer to another element.

Assuming, arguendo, (and assumptions have **no** basis in factual determinations under 35 U.S.C. §102), that one having ordinary skill in the art would have provided such dummy contact and via plugs in the Fig. 3 embodiment, they would **not**, repeat **not**, be provided in an opening which reaches the **first conductive layer** as specifically recited in

claim 5. Rather, as disclosed by Moslehi, such dummy plugs would fill openings positioned precisely where Moslehi states, i.e., **between top and bottom etch-resistant layers- not, repeat not, in contact with a lower conductive feature.**

It should, therefore, be apparent that the Examiner did not factually establish a prima facie basis to deny patentability to the subject matter of claims 5 through 9 within the meaning of 35 U.S.C. §102. Indeed, the above argued fundamental difference between the claimed interconnection structure and Moslehi's interconnection structure undermines the factual determination that Moslehi discloses an interconnection structure identically corresponding to that claimed. *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics Inc., supra; Kloster Speedsteel AB v. Crucible Inc., supra.*

Applicants, therefore, submit that the imposed rejection of claims 5 through 9 under 35 U.S.C. §102 for lack of novelty as evidenced by Moslehi is not factually viable and, hence, solicit withdrawal thereof.

Claims 2 through 4 were rejected under 35 U.S.C. §103 for obviousness predicated upon Sachiko in view of Li et al.

In the statement of the rejection, the Examiner concluded that one having ordinary skill in the art would have been motivated to modify the structure disclosed by Sachiko et al. by providing an insulating layer in view of Li et al. This rejection is traversed.

Independent claim 2 is directed to an interconnection structure which comprises, inter alia, first and second interconnection portions wherein the second interconnection portion has a two layered structure. This two layered structured comprises a top layer

and a metal layer which is composed of a layer **excluding a copper plated layer having microvoids**. No such structure is disclosed by either of the applied references.

Indeed, advertent to Figs. 2 and 4 of Sachiko et al., groove interconnections 9a and 9b, are both composed of a copper plated and include a large number of microvoids. Clearly, neither Sachiko et al. nor Li et al. disclose or suggest a composite interconnection portion comprising a metal layer which excludes a copper plated layer having microvoids, as claimed. In short, even if the applied references are combined as proposed by the Examiner, the claimed invention would **not** result. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 USPQ2d 1434 (Fed. Cir. 1988).

Applicants would stress that in accordance with claim 2, a portion directly connected to the hole is made from a layer which excludes a copper plated layer having microvoids. This feature is functionally significant, because it effectively suppresses the concentration of voids under the hole due to stress migration.

In contradistinction to the present invention, Sachiko et al. employ a copper plated layer having a large number of microvoids in a portion corresponding to where the metal layer of the present invention is situated. Hence, the advantageous effective suppression of voids under the hole due to stress migration achieved by present invention can not be achieved by either Sachiko et al. or Li et al.

In summary, as neither of the applied references discloses a structure having the metal layer defined in claim 2, even if the applied references are combined, the claimed invention would not result. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, *supra*. Applicants, therefore, submit that the imposed rejection of claims 2 through 4 under 35 U.S.C. §103

for obviousness predicated upon Sachiko in view of Li et al. does not factually or legally viable and, hence, solicit withdrawal thereof.

Claims 10 and 11 were rejected under 35 U.S.C. §103 for obviousness predicated upon Moslehi.

This rejection is traversed. Specifically, claims 10 and 11 depend from independent claim 5. Applicants incorporate herein the arguments previously advanced in traversing the imposed rejection of claim 5 under 35 U.S.C. §102 for lack of novelty as evidenced by Moslehi. The Examiner's additional comments with respect to claims 10 and 11 do not cure the argued deficiencies of Moslehi who neither discloses nor suggests forming a dummy via in contact or reaching any interconnection. Rather, Moslehi only discloses forming a dummy via between upper and lower etch resistant layers which are not conductive layers.

Based upon the foregoing, Applicants submit that the imposed rejection of claims 10 and 11 under 35 U.S.C. §103 for obviousness predicated upon Moslehi is not factually or legally viable and, hence, solicit withdrawal thereof.

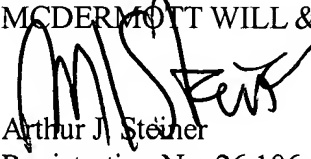
It should, therefore, be apparent that the imposed objection and rejections have been overcome and that all pending claims are in condition for immediate allowance. Favorable consideration is, therefore, respectfully solicited.

10/657,094

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

MCDERMOTT WILL & EMERY LLP



Arthur J. Steiner
Registration No. 26,106

600 13th Street, N.W.
Washington, DC 20005-3096
(202) 756-8000 AJS:ntb
Facsimile: (202) 756-8087
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